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United States
Department of
Agriculture

Soil
Conservation
Service

Bozeman,
Montana

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Montana Water Supply Outlook

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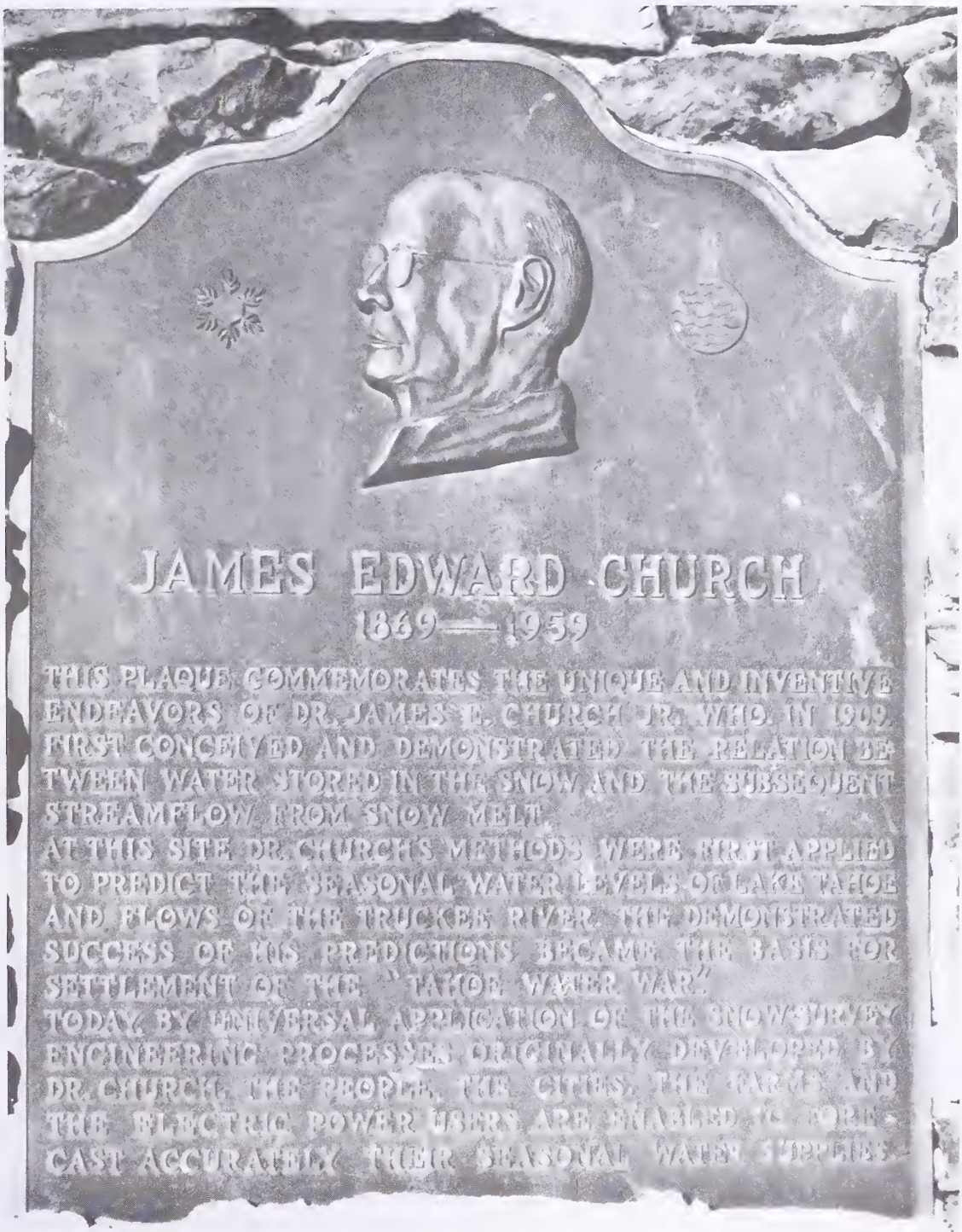
JAMES EDWARD CHURCH
1869—1959
THIS PLAQUE COMMEMORATES THE UNIQUE AND INVENTIVE
ENDEAVORS OF DR. JAMES E. CHURCH JR. WHO IN 1909
FIRST CONCEIVED AND DEMONSTRATED THE RELATION BE-
TWEEN WATER STORED IN THE SNOW AND THE SUBSEQUENT
STREAMFLOW FROM SNOW MELT.
AT THIS SITE DR. CHURCH'S METHODS WERE FIRST APPLIED
TO PREDICT THE SEASONAL WATER LEVELS OF LAKE TAHOE
AND FLOWS OF THE TRUCKEE RIVER. HIS DEMONSTRATED
SUCCESS OF HIS PREDICTIONS BECAME THE BASIS FOR
SETTLEMENT OF THE "TAHOE WATER WAR."
TODAY, BY UNIVERSAL APPLICATION OF THE SNOW SURVEY
ENGINEERING PROCESSES ORIGINALLY DEVELOPED BY
DR. CHURCH, THE PEOPLE, THE CITIES, THE FARMS AND
THE ELECTRIC POWER USERS ARE ENABLED TO FORE-
CAST ACCURATELY THEIR SEASONAL WATER SUPPLIES.

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Foreword

How Forecasts Are Made

Most of the annual streamflow in the Western United States originates as snowfall that has accumulated high in the mountains during winter and early spring. As the snowpack accumulates, hydrologists estimate the runoff that will occur when it melts. Predictions are based on careful measurements of snow water equivalent at selected index points. Precipitation, temperature, soil moisture and antecedent streamflow data are combined with snowpack data to prepare runoff forecasts. Streamflow forecasts are coordinated by Soil Conservation Service and National Weather Service hydrologists. This report presents a comprehensive picture of water supply outlook conditions for areas dependent upon surface runoff. It includes selected streamflow forecasts, summarized snowpack and precipitation data, reservoir storage data, and narratives describing current conditions.

Snowpack data are obtained by using a combination of manual and automated measurement methods. Manual readings of snow depth and water equivalent are taken at locations called snow courses on a monthly or semi-monthly schedule during the winter. In addition, snow water equivalent, precipitation and temperature are monitored on a daily basis and transmitted via radio telemetry to central data collection facilities. Both monthly and daily data are used to project snowmelt runoff.

An error is associated with each forecast, and this error decreases as the season progresses and more data becomes available. To express the range of error that can be expected, "most probable" forecasts are issued along with a range representing a "reasonable minimum" and a "reasonable maximum". Actual streamflow can be expected to fall within this range in eight out of ten years. Additionally two specific scenarios are provided based on the assumption that subsequent precipitation will be "wet", above average, or "dry", below average.

For More Information

Copies of Monthly Water Supply Outlook Reports and other reports may be obtained from the states listed below. An annual snow survey data summary is published by the Soil Conservation Service for each of the western states. Historical snow survey data may be obtained at those same offices.

STATE	ADDRESS
Alaska	201 East 9th Ave., Suite 300, Anchorage, AK 99501-3687
Arizona	201 East Indianola Ave., Suite 200, Phoenix, AZ 85012
Colorado	2490 West 26th Ave., Building A, 3rd floor, Denver, CO 80211
Idaho	3244 Elder Street, Room 124, Boise, ID 83705
Montana	10 East Babcock, Room 443, Federal Building, Bozeman, MT 59715
Nevada	1201 Terminal Way, Room 219, Reno, NV 89502
New Mexico	517 Gold Ave. S.W., Room 3301, Albuquerque, NM 87102-3157
Oregon	1220 Southwest 3rd Ave., Room 1640, Portland, OR 97204
Utah	4402 Federal Building, 125 South State Street, Salt Lake City, UT 84147
Washington	W. 920 Riverside, Room 360, Spokane, WA 99201-1080
Wyoming	Federal Building, 100 "B" Street, Room 3124, Casper, WY 82601

In addition to state reports, a Water Supply Outlook for the Western United States is published by the Soil Conservation Service and National Weather Service monthly, January through May. Reports may be obtained from the Soil Conservation Service, West National Technical Center, 511 Northwest Broadway, Room 248, Portland, OR 97209-3489.

Water supply reports published by other agencies:

California — Snow Survey Branch, California Department of Water Resources, P.O. Box 388, Sacramento, CA 95802; British Columbia — The Ministry of Environment, Water Investigations Branch, Parliament Buildings, Victoria, British Columbia, V8V 1X5; Yukon Territory — Department of Indian and Northern Affairs, Northern Operations Branch, 200 Range Road, Whitehorse, Yukon Territory, Y1A3V1; Alberta, Environment Technical Services Division, 9820 106th St., Edmonton, Alberta T5K 2J6.

Montana
Water Supply Outlook

and

Federal - State - Private
Cooperative Snow Surveys

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Programs and assistance of the United States Department of Agriculture are available without regard to race, creed, color, sex, age, or national origin.

ON THE COVER:

This plaque on the outlet gate at Lake Tahoe, Nevada, commemorates the start of snow surveys in 1909.

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General Outlook

Summary

Mountain precipitation for May was near to above average in the Kootenai, Flathead, Lower Clark Fork, Gallatin, St. Mary and Yellowstone Basins and below average in the other areas. Snowpacks are near average in the Kootenai, Flathead, Sun, Teton, Marias, St. Mary and parts of the Yellowstone River drainages. Runoff during May was near to above average in the Blackfoot, Flathead, Madison, Upper Gallatin, Sun, Yellowstone, Boulder, Stillwater and Clarks Fork Rivers. Peak snowmelt runoff is expected to occur just before mid-June on the Gallatin and Yellowstone Rivers and on tributaries to the Yellowstone above Billings. Most other streams probably peaked just before mid-May. However, those with higher elevations could approach or exceed earlier peaks in early June depending on temperatures and precipitation. Runoff for the remainder of the season is expected to be below average on most streams but considerably more than last year. Streams in the northwestern part of the State and those originating in or near Yellowstone National Park should have near average runoff. Most reservoirs are full or should fill. However, some reservoirs in areas having low inflows may not fill.

Snowpack

Low elevation snow has melted but higher elevations still have some snow. Snowpacks are generally near to above average in northwest Montana and in parts of the Yellowstone River Headwaters. Other areas of the State have snowpacks that are generally 10 to 30 percent less than average. Snowpack in the headwaters of streams flowing into Montana from Wyoming are generally well below average. In all areas, except for Wyoming, the snow is much better than it was a year ago.

Precipitation

Mountain precipitation was quite variable for May. It was near to above average in the Kootenai, Flathead, Lower Clark Fork, Gallatin, St. Mary, and Yellowstone River Basins and 10 to 30 percent below average in other drainages. Weather was also variable. Ranging from warm temperatures that created some snowmelt to quite cool systems that deposited snow at some valley areas and most mountain locations.

See Page 24 for future status of this report

Reservoirs

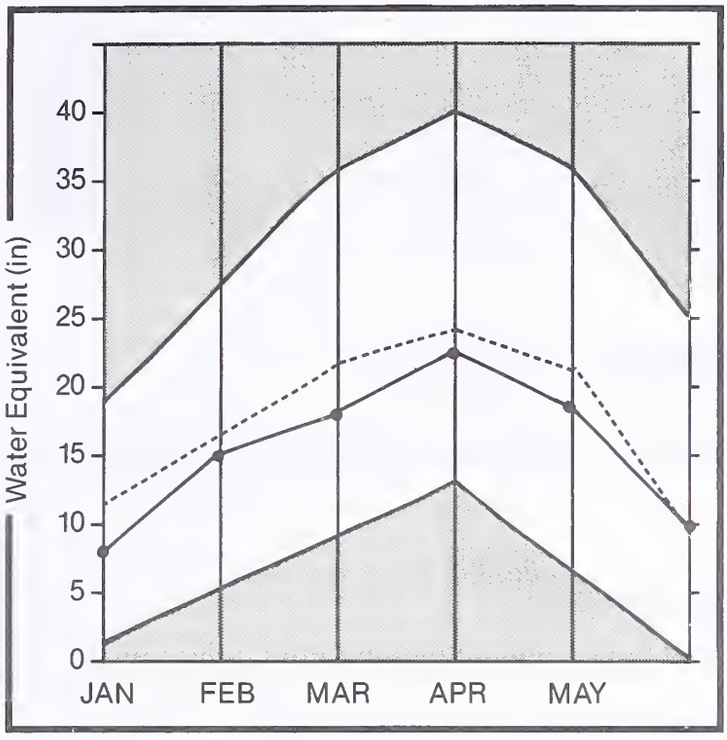
Many reservoirs in the State are full or nearly full. Most are expected to fill this year or to be nearly full. However, Lima and Clark Canyon Reservoirs as well as those on the Milk River and some in central Montana may not fill. The amount of storage will depend on remaining snowmelt and the amount of June precipitation.

Streamflow

Snowmelt around May 10-12 increased runoff on most streams around the State and then flows receded due to cooler weather. Most streams west of the Divide and those in southwest Montana probably had peak snowmelt runoff during this period. However, some streams with higher elevations could see higher levels in early June as temperatures warm. The Gallatin River and the Yellowstone River as well as most of its tributaries are expected to reach peak snowmelt runoff just before mid-June. Runoff during May varied from near average on the Blackfoot, Flathead and Upper Gallatin Drainages to below average on the Upper Clark Fork and on most of the Missouri Headwaters streams. May streamflows in most areas of the Yellowstone River Drainage was above average.

Kootenai Basin

Mountain snowpack* (inches)



*Kootenai in Montana

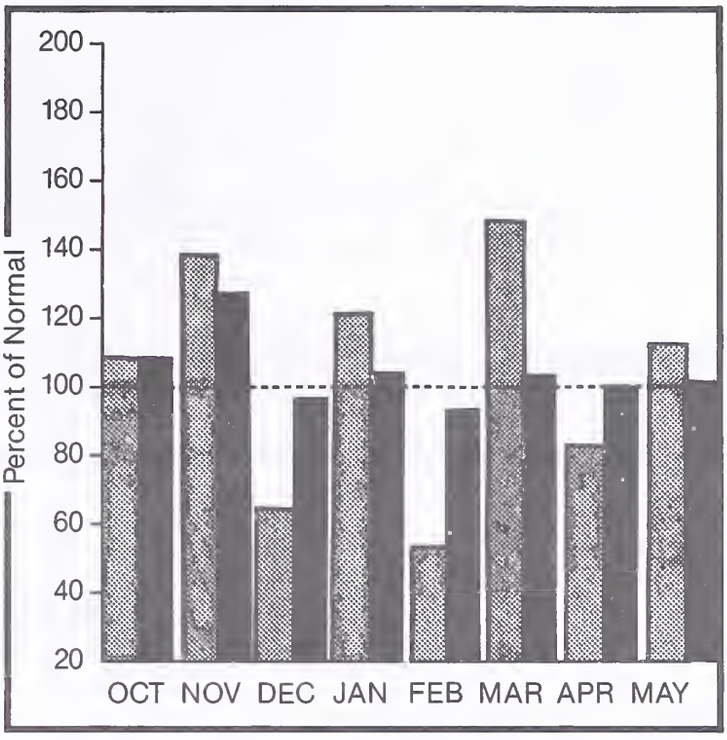
Maximum

Minimum

Average

Current

Precipitation* (percent of normal)



*Based on selected stations

Monthly precipitation

Year to date precipitation

Water Supply Outlook

Runoff during May was a little below average on tributary streams and on the Kootenai River. Tributaries to the Kootenai reached peak snowmelt runoff in April and early May. Mountain precipitation was a little above average in May. There is still snow at the higher elevations but lower elevation snowpacks have melted. Current snowpack is near average. Streamflows for the remainder of the season are expected to be below average on tributary streams and near average on the Kootenai River.

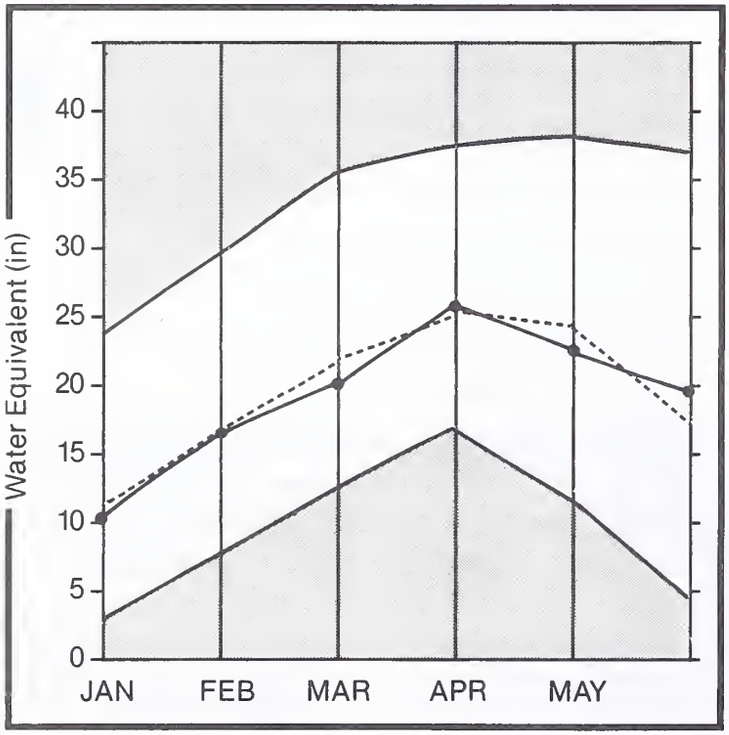
For more information contact your local Soil Conservation Service Office.

KOOTENAI RIVER BASIN in Montana

RESERVOIR STORAGE (1000AF)					WATERSHED SNOWPACK ANALYSIS			
RESERVOIR	USEABLE CAPACITY	** USEABLE STORAGE ** THIS YEAR	LAST YEAR	AVG.	WATERSHED	NO. COURSES AVG'D	THIS YEAR AS % OF LAST YR.	AVERAGE
LAKE KOOCANUSA	5748.0	3096.0	2895.0	3183.0	EAST KOOTENAI in B.C.	7	198	150
					KOOTENAI in MONTANA	6	193	97
					KOOTENAI ab BONNERS FERRY	13	196	127

Flathead Basin

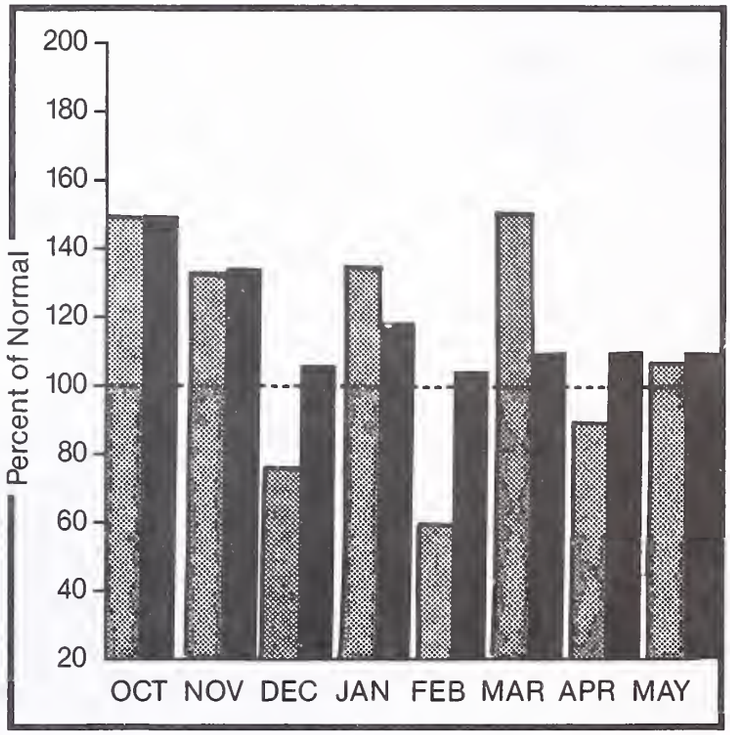
Mountain snowpack* (inches)



*Flathead

Maximum
Minimum
Average
Current

Precipitation* (percent of normal)



*Based on selected stations

Monthly precipitation
Year to date precipitation

Water Supply Outlook

May runoff was near to a little below average. Most streams reached peak snowmelt runoff around May 10 and 11. However, those with higher elevation headwaters could still produce flow nearly as high or higher in early June with warm temperatures and some rainfall. Lower elevation snow has melted but some remains at higher elevations. Currently the snowpack is a little above average. Mountain precipitation during May was near average. Streamflows for the remainder of the year are expected to be a little below average.

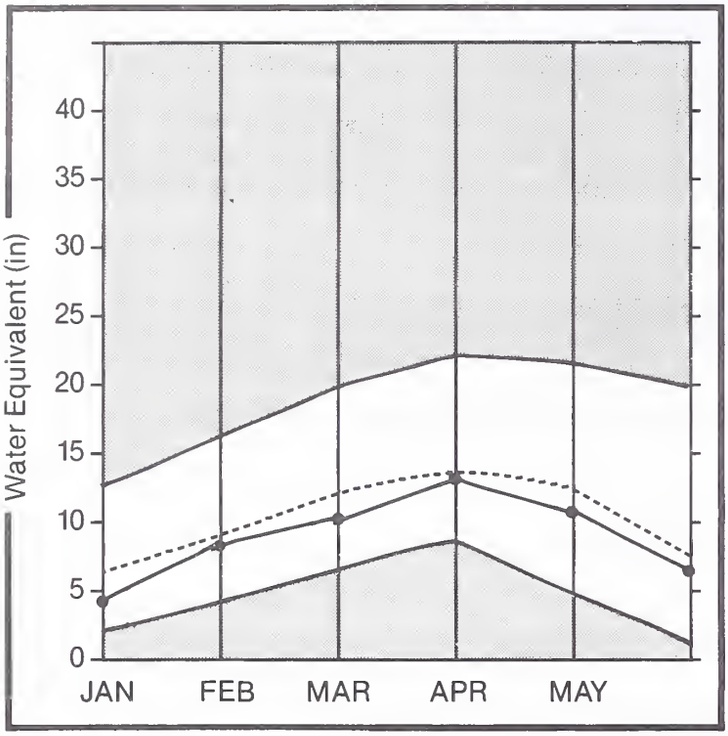
For more information contact your local Soil Conservation Service Office.

FLATHEAD RIVER BASIN

RESERVOIR STORAGE (1000AF)					WATERSHED SNOWPACK ANALYSIS			
RESERVOIR	USEABLE CAPACITY	** USEABLE STORAGE ** THIS YEAR	LAST YEAR	AVG.	WATERSHED	NO. COURSES AVG'D	THIS YEAR AS % OF LAST YR.	AVERAGE
CAMAS (4)	45.2	23.6	17.8	31.3	NORTH FORK FLATHEAD	8	216	112
MISSION VALLEY (8)	100.0	67.0	64.8	67.9	MIDDLE FORK FLATHEAD	4	259	103
HUNGRY HORSE	3451.0	2281.0	1630.0	2663.0	SOUTH FORK FLATHEAD	3	294	117
FLATHEAD LAKE	1791.0	1509.0	1480.0	1468.0	STILLWATER-WHITEFISH	4	422	108
					SWAN	6	256	108
					LITTLE BITTERROOT	1	0	0
					FLATHEAD	18	254	110

Clark Fork Basin above Missoula

Mountain snowpack* (inches)



*Clark Fork above Missoula

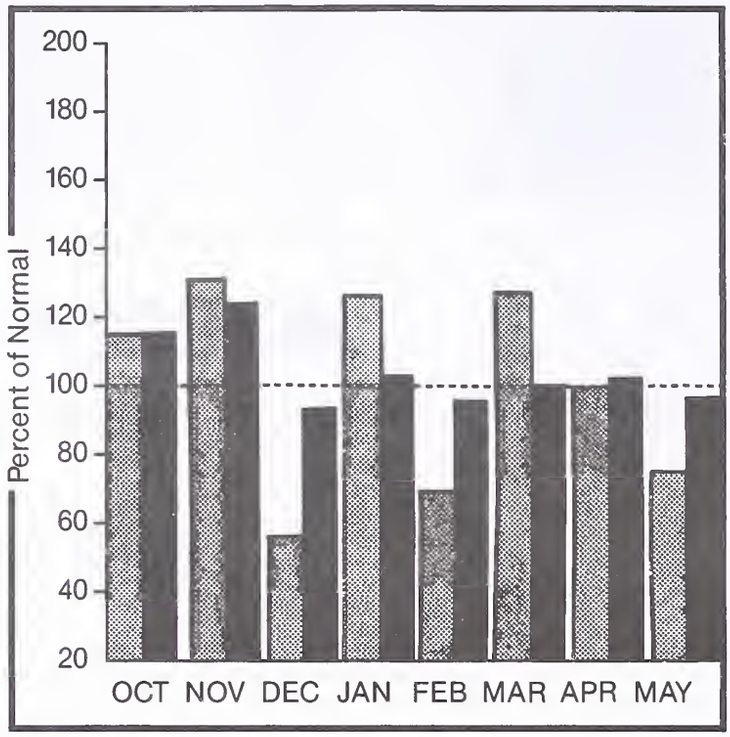
Maximum

Minimum

Average

Current

Precipitation* (percent of normal)



*Based on selected stations

Monthly precipitation

Year to date precipitation

Water Supply Outlook

May precipitation in the mountains was generally below average. Runoff in May was a little above average from the Blackfoot River and a little below average from the Clark Fork River above the Blackfoot. Some snow remains at the higher elevations and the snowpack is currently below average. Most streams probably reached peak snowmelt runoff around May 12 but flows could come up again in early June if temperatures warm and significant rainfall occurs. Runoff for the remainder of the season is expected to be a little below average.

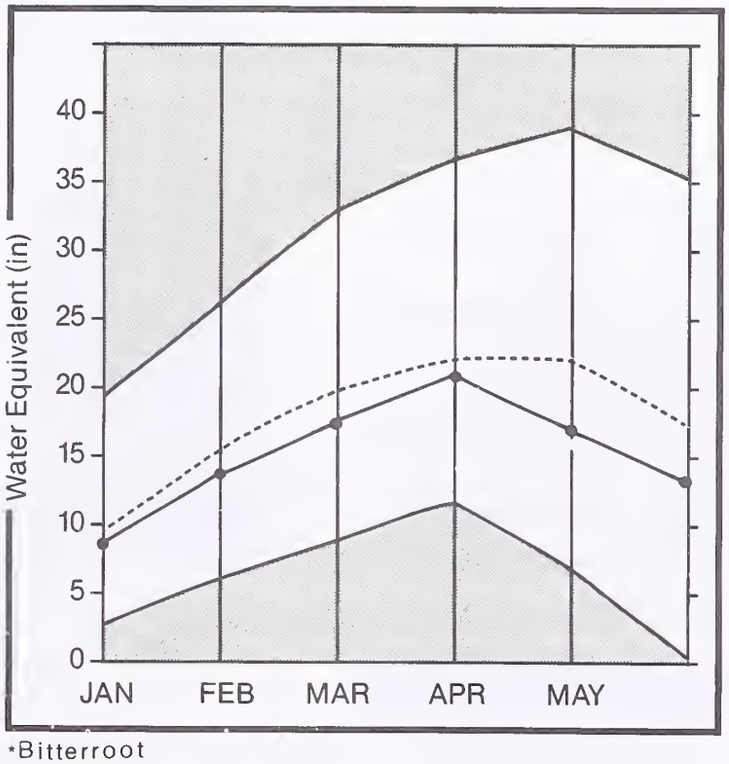
For more information contact your local Soil Conservation Service Office.

CLARK FORK RIVER BASIN above Missoula

RESERVOIR STORAGE (1000AF)					WATERSHED SNOWPACK ANALYSIS			
RESERVOIR	USEABLE CAPACITY	** USEABLE STORAGE ** THIS YEAR	LAST YEAR	AVG.	WATERSHED	NO. COURSES AVG'D	THIS YEAR AS % OF LAST YR.	AVERAGE
GEORGETOWN LAKE	31.0	27.8	30.2	26.5	CLARK FORK ab BLACKFOOT	14	156	62
LOWER WILLOW CREEK		NO REPORT			BLACKFOOT	7	437	91
NEVADA CREEK	12.6	12.4	5.2	11.6	CLARK FORK ab MISSOULA	18	219	79

Clark Fork Basin below Missoula

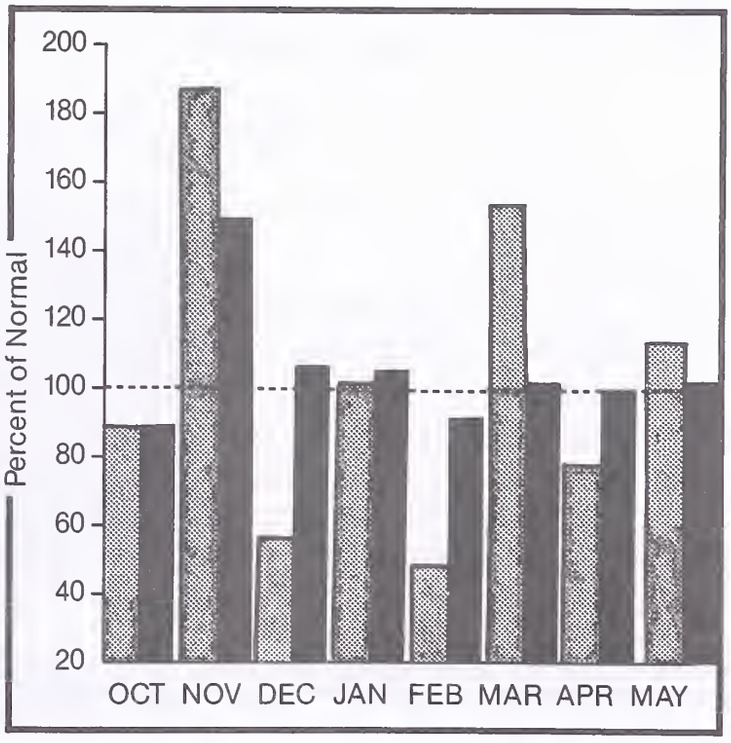
Mountain snowpack* (inches)



*Bitterroot

Maximum
Minimum
Average
Current

Precipitation* (percent of normal)



*Based on selected stations

Monthly precipitation
Year to date precipitation

Water Supply Outlook

Runoff in May was a little below average. Mountain precipitation was a little above average in May. There is still snow remaining at the higher elevations and the snowpack is currently below average. Most streams reached their highest flows around May 11 and 12. All streams will have increased runoff when the weather warms but whether or not the flows will be higher than in early May depends on temperatures and precipitation in early June. Runoff for the remainder of the season is expected to be a little below average.

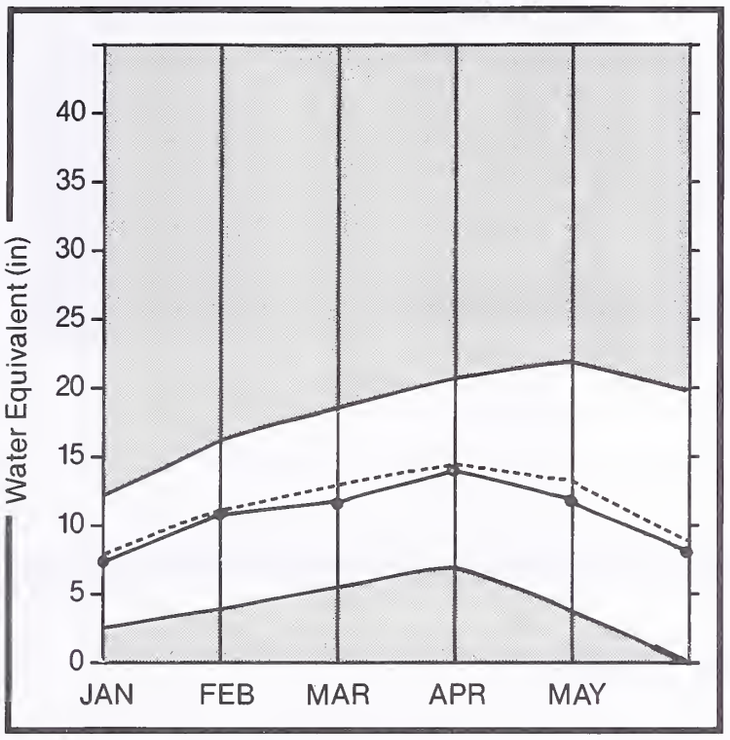
For more information contact your local Soil Conservation Service Office.

CLARK FORK RIVER BASIN below Missoula

RESERVOIR STORAGE (1000AF)					WATERSHED SNOWPACK ANALYSIS			
RESERVOIR	USEABLE CAPACITY	** USEABLE STORAGE ** THIS YEAR	LAST YEAR	AVG.	WATERSHED	NO. COURSES AVG'D	THIS YEAR AS % OF LAST YR.	AVERAGE
PAINTED ROCKS LAKE	31.7	31.7	31.7	30.4	CLARK FORK ab MISSOULA	18	219	79
NOXON RAPIDS	335.0	315.1	321.6	270.4	BITTERROOT	13	179	69
COMO	34.9	29.3	33.5	28.2	LWR CLARK FK bl MISSOULA	13	150	83
					BITTERROOT & LWR C.F.	24	158	78
					CLARK FORK TOTAL	41	175	77
					FLATHEAD	17	261	111
					PEND OREILLE	54	198	88

Jefferson Basin

Mountain snowpack* (inches)



* Jefferson

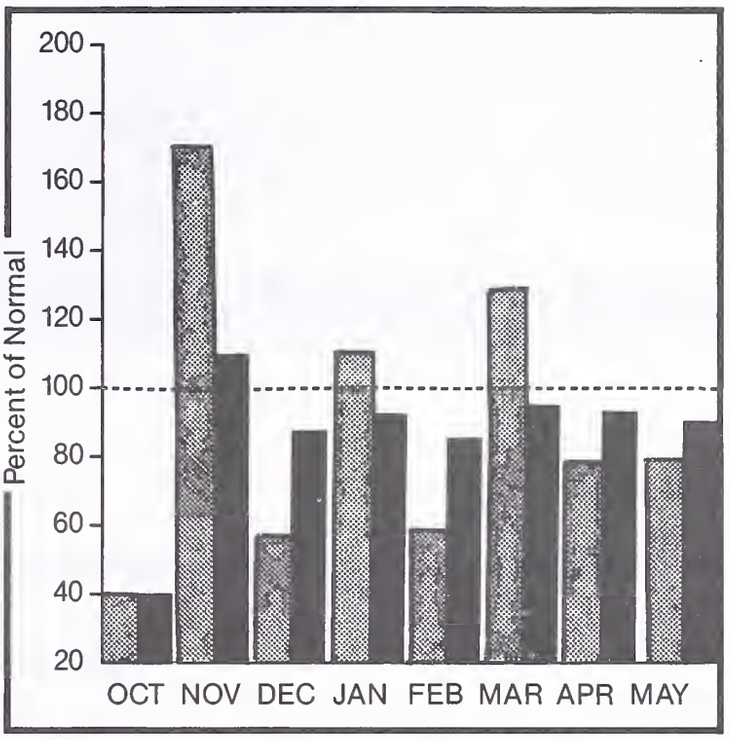
Maximum

Minimum

Average

Current

Precipitation* (percent of normal)



*Based on selected stations

Monthly precipitation

Year to date precipitation

Water Supply Outlook

Mountain precipitation at most locations was below average in May. Runoff during May was below to well below average. Snow is gone from lower elevations but some still remains at the higher elevations. Currently the snowpack is below average. Most streams reached peak snowmelt runoff just before mid-May but the Big Hole River should have its snowmelt peak in early June. Most of the other streams should see some increased runoff as temperatures warm. Runoff for the remainder of the season is expected to be below average.

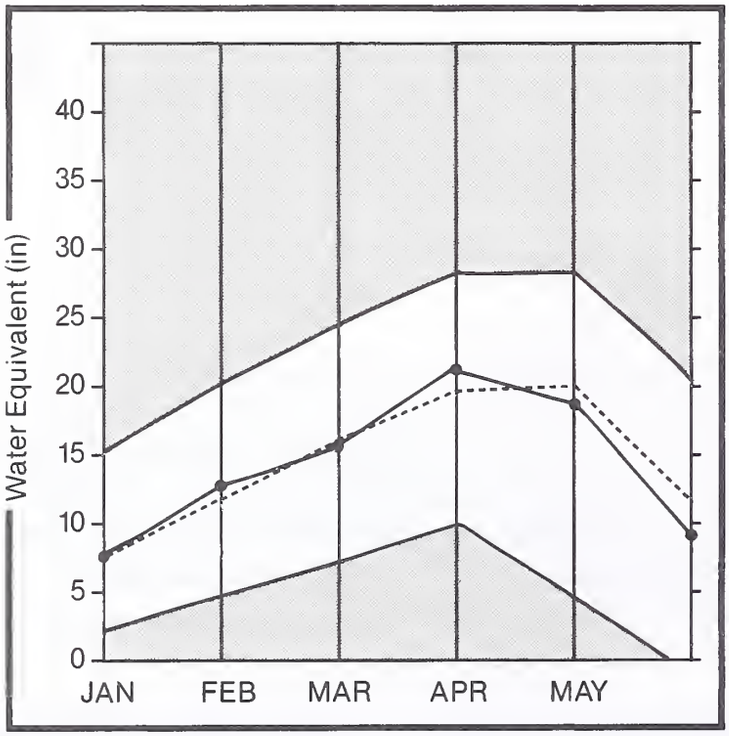
For more information contact your local Soil Conservation Service Office.

JEFFERSON RIVER BASIN

RESERVOIR STORAGE (1000AF)					WATERSHED SNOWPACK ANALYSIS			
RESERVOIR	USEABLE CAPACITY	** USEABLE STORAGE ** THIS YEAR	LAST YEAR	AVG.	WATERSHED	NO. COURSES AVG'D	THIS YEAR AS % OF LAST YR.	AVERAGE
LIMA	84.0	36.1	36.9	67.0	BEAVERHEAD	11	200	66
CLARK CANYON	255.6	111.8	157.7	171.0	RUBY	4	759	83
RUBY RIVER	38.8	39.5	40.6	38.0	BIGHOLE	10	188	80
					BOULDER	3	112	57
					JEFFERSON	21	232	76

Madison Basin

Mountain snowpack* (inches)



*Madison

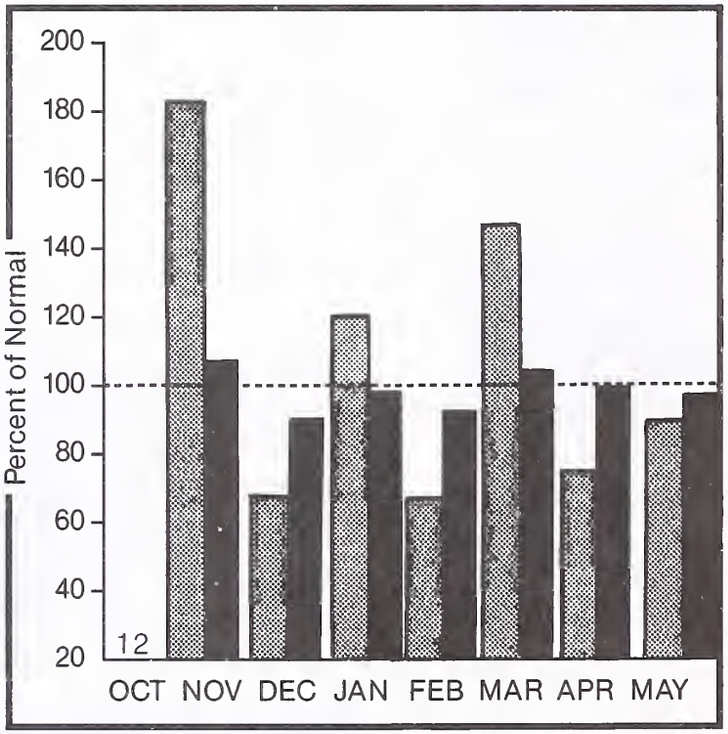
Maximum

Minimum

Average

Current

Precipitation* (percent of normal)



*Based on selected stations

Monthly precipitation

Year to date precipitation

Water Supply Outlook

Runoff in May was near average. Mountain precipitation for May was below average. Lower elevation snow has melted and the high elevation snowpack is below average. Runoff was at the highest flows of the season around May 10 and should increase again with warm weather in early June. Streamflows for the remainder of the season should be near average.

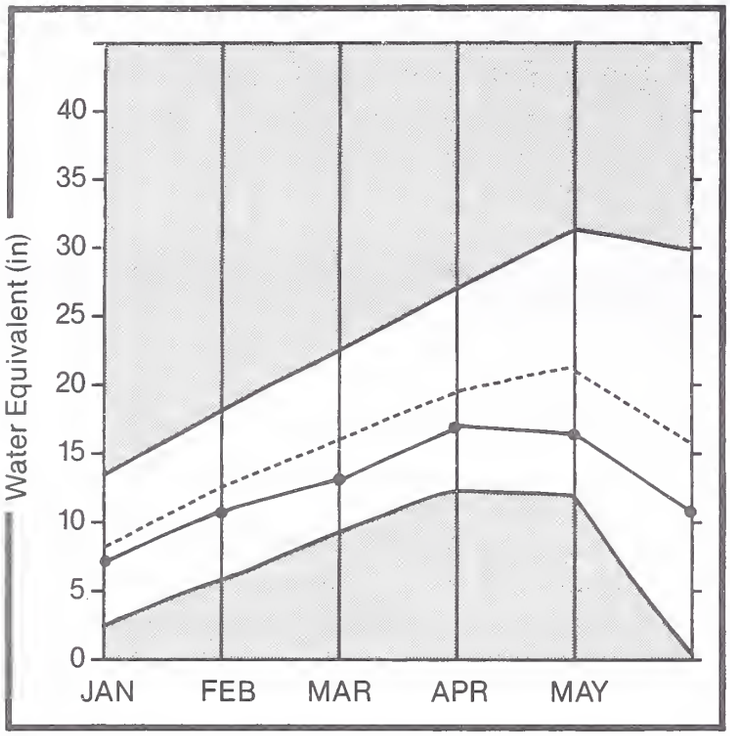
For more information contact your local Soil Conservation Service Office.

MADISON RIVER BASIN

RESERVOIR STORAGE (1000AF)					WATERSHED SNOWPACK ANALYSIS			
RESERVOIR	USEABLE CAPACITY	** USEABLE STORAGE ** THIS YEAR	LAST YEAR	AVG.	WATERSHED	NO. COURSES AVG'D	THIS YEAR AS % OF LAST YR.	AVERAGE
ENNIS LAKE	41.0	35.8	37.7	35.7	MADISON above HEBGEN	4	185	80
HEBGEN LAKE	377.5	318.4	342.2	298.3	LOWER MADISON	6	550	73
					MADISON	10	350	75

Gallatin Basin

Mountain snowpack* (inches)



*Gallatin

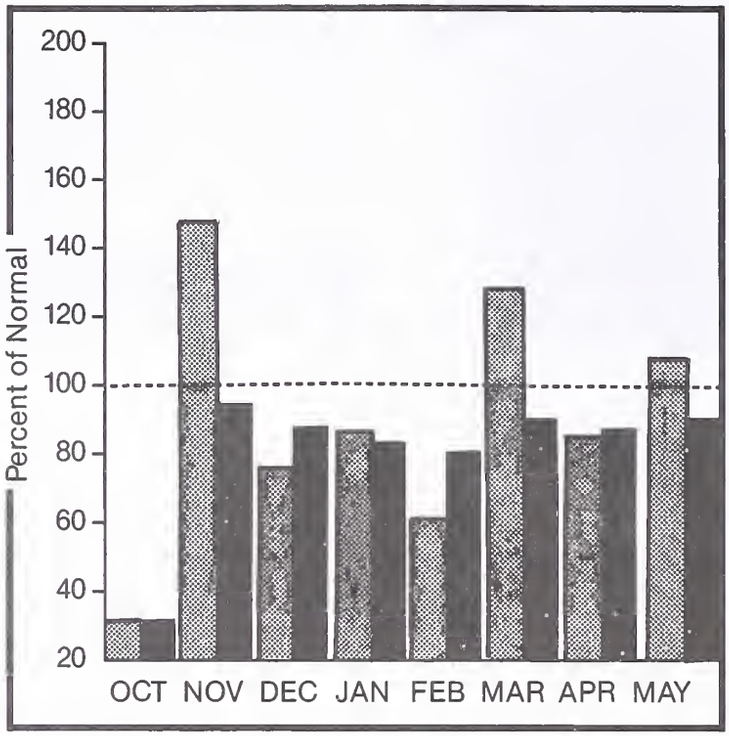
Maximum

Minimum

Average

Current

Precipitation* (percent of normal)



*Based on selected stations

Monthly precipitation

Year to date precipitation

Water Supply Outlook

Mountain precipitation during May was near to a little above average while runoff for the month was near to a little below average. Peak snowmelt runoff on the Gallatin River is still expected to occur just before mid-June. Currently the snowpack is below average. Runoff for the remainder of the season is expected to be a little below average.

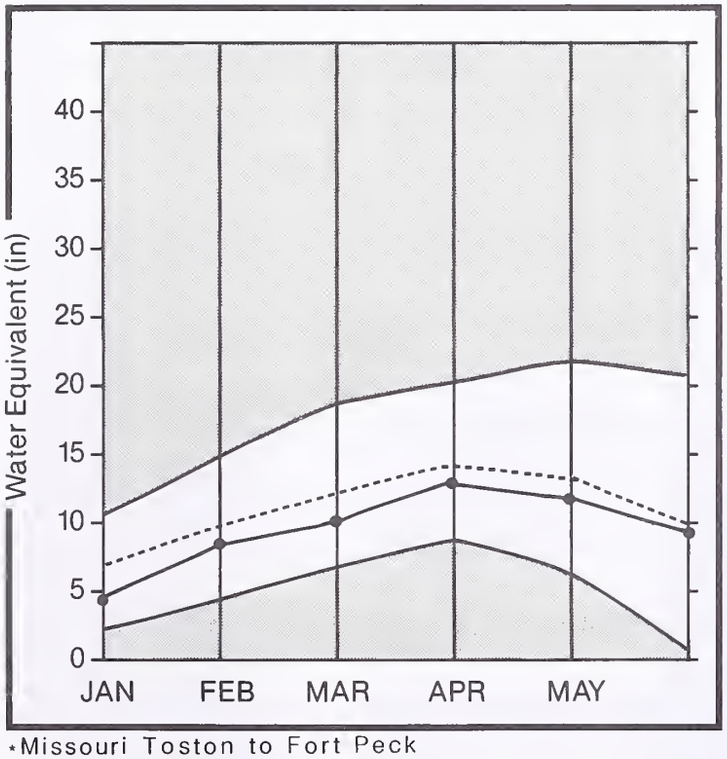
For more information contact your local Soil Conservation Service Office.

GALLATIN RIVER BASIN

RESERVOIR STORAGE (1000AF)					WATERSHED SNOWPACK ANALYSIS			
RESERVOIR	USEABLE CAPACITY	** USEABLE STORAGE ** THIS YEAR	LAST YEAR	AVG.	WATERSHED	NO. COURSES AVG'D	THIS YEAR AS % OF LAST YR.	AVERAGE
MIDDLE CREEK	8.0	7.5	8.0	6.8	UPPER GALLATIN	4	219	68
					EAST GALLATIN	6	295	65
					GALLATIN	9	340	64

Missouri Basin

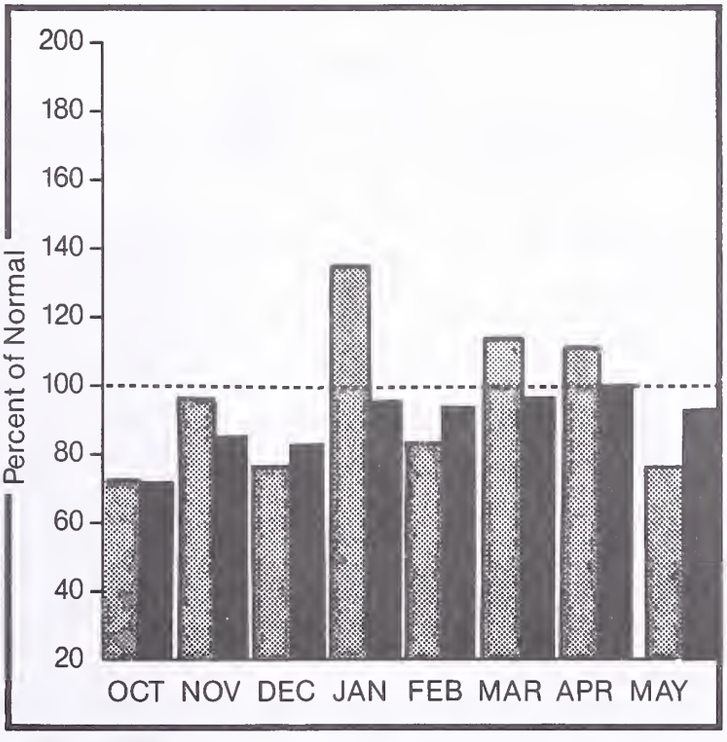
Mountain snowpack* (inches)



*Missouri Toston to Fort Peck

Maximum
Minimum
Average
Current

Precipitation* (percent of normal)



*Based on selected stations

Monthly precipitation
Year to date precipitation

Water Supply Outlook

Mountain precipitation in May was generally below average at most locations. May streamflows were generally below average. Current snowpack is below average. So far this season, the highest streamflows from uncontrolled streams occurred around May 10-12. Flows are expected to increase again in early June as weather warms. Runoff for the remainder of the season is expected to be a little below average on most streams.

For more information contact your local Soil Conservation Service Office.

MISSOURI RIVER BASIN

RESERVOIR STORAGE (1000AF)

RESERVOIR	USEABLE CAPACITY	** USEABLE STORAGE ** THIS YEAR	LAST YEAR	AVG.
CANYON FERRY LAKE	2043.0	1470.0	1682.0	1672.0
HELENA VALLEY	9.2	5.9	6.1	7.5
LAKE HELENA	10.4	11.1	10.9	10.0
HAUSER & HELENA	61.9	63.6	63.1	60.5
HOLTER LAKE	81.9	80.4	80.5	74.9
SMITH RIVER	10.6	8.0	6.7	10.8
NEWLAN CREEK	12.4	8.9	9.4	10.6
BAIR	7.0	4.8	2.8	6.4
MARTINSDALE	23.1	15.0	8.9	17.4
DEADMAN'S BASIN	72.2	33.8	38.1	57.4
FORT PECK LAKE*	18.9	13.0	14.7	15.7

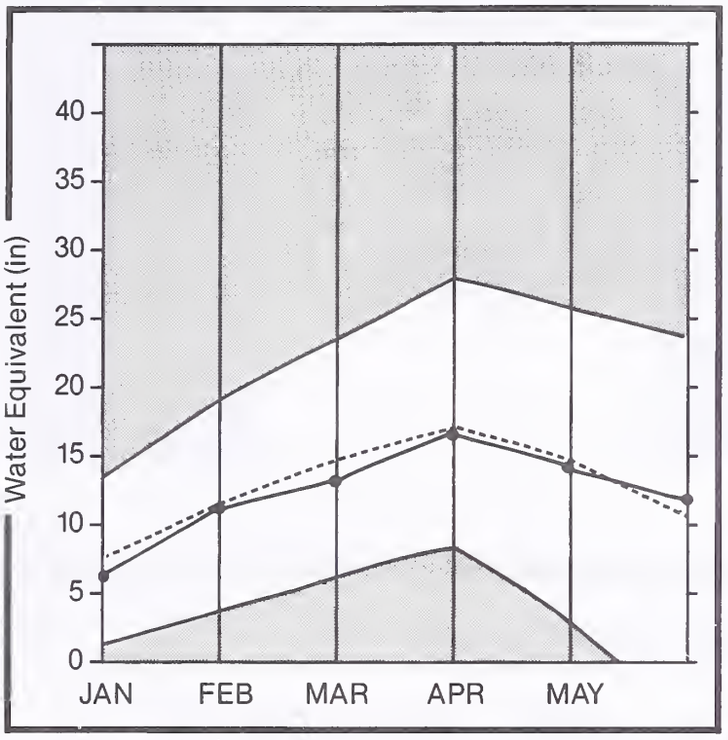
*Millon Acre Feet

WATERSHED SNOWPACK ANALYSIS

WATERSHED	NO. COURSES AVG'D	THIS YEAR AS % OF LAST YR.	AVERAGE
MISSOURI HEADWATERS	34	253	71
WEST SIDE MISSOURI	3	108	50
SMITH-BELT	5	1132	93
MISSOURI MAINSTEM	8	339	77
SUN-TETON-MARIAS	6	701	110
JUDITH-MUSSELSHELL	6	714	93
MISSOURI above FORT PECK	49	325	78
MILK HEADWATERS	2	0	87
BEAR PAW	5	0	138
MILK RIVER	7	0	95
MISSOURI in MONTANA	55	328	78
MISSOURI blw YELLOWSTONE	93	224	78

Sun, Teton and Marias Basins

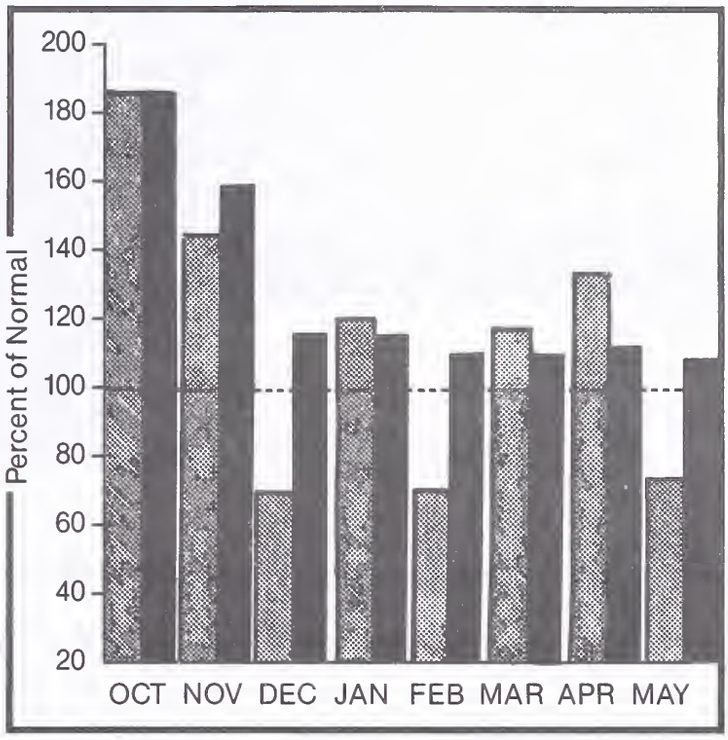
Mountain snowpack* (inches)



*Sun-Teton-Marias

Maximum
Minimum
Average
Current

Precipitation* (percent of normal)



*Based on selected stations

Monthly precipitation
Year to date precipitation

Water Supply Outlook

During May, mountain precipitation was below average. Runoff for the month was generally near average. Currently, the snowpack is a little above average. Many streams had their highest flow of the season around May 10-12 and then dropped down. Flows should increase in early June with warm temperatures. Runoff for the remainder of the season is expected to be near to a little below average.

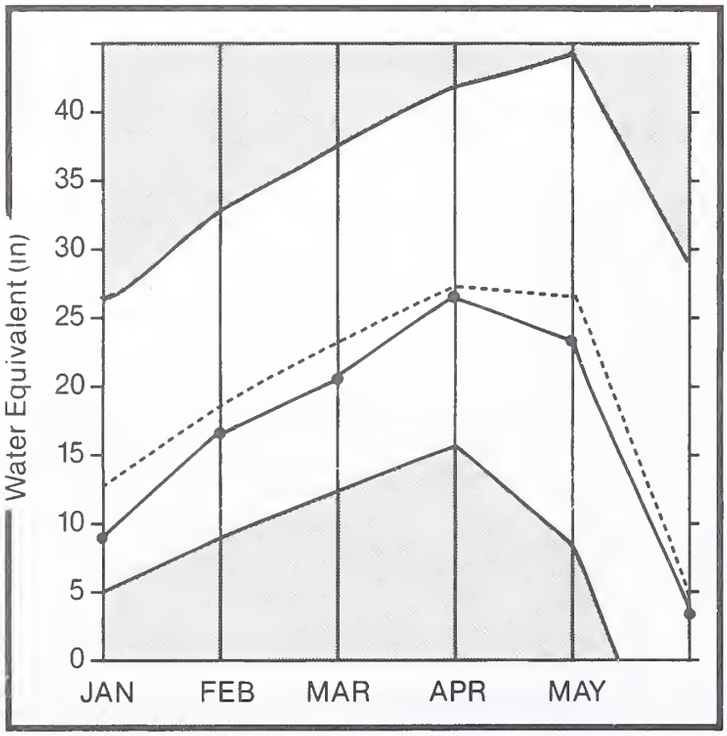
For more information contact your local Soil Conservation Service Office.

SUN-TETON-MARIAS RIVER BASINS

RESERVOIR STORAGE (1000AF)					WATERSHED SNOWPACK ANALYSIS			
RESERVOIR	USEABLE CAPACITY	** USEABLE STORAGE ** THIS YEAR	LAST YEAR	AVG.	WATERSHED	NO. COURSES AVG'D	THIS YEAR AS % OF LAST YR.	AVERAGE
GIBSON	99.1	80.4	86.5	90.2	SUN-TETON	4	0	104
PISHKUN	32.0	27.2	27.5	29.0	MARIAS	2	541	112
WILLOW CREEK	32.2	29.7	29.8	28.0	SUN-TETON-MARIAS	6	701	110
LOWER TWO MEDICINE LAKE	11.9	12.5	12.5	12.4				
FOUR HORNS LAKE	19.2	5.8	13.0	13.2				
SWIFT	30.0	19.3	26.5	24.5				
LAKE FRANCES	112.0	80.5	93.0	85.4				
LAKE ELWELL (TIBER)	1347.0	826.7	741.8	662.6				

St. Mary and Milk Basins

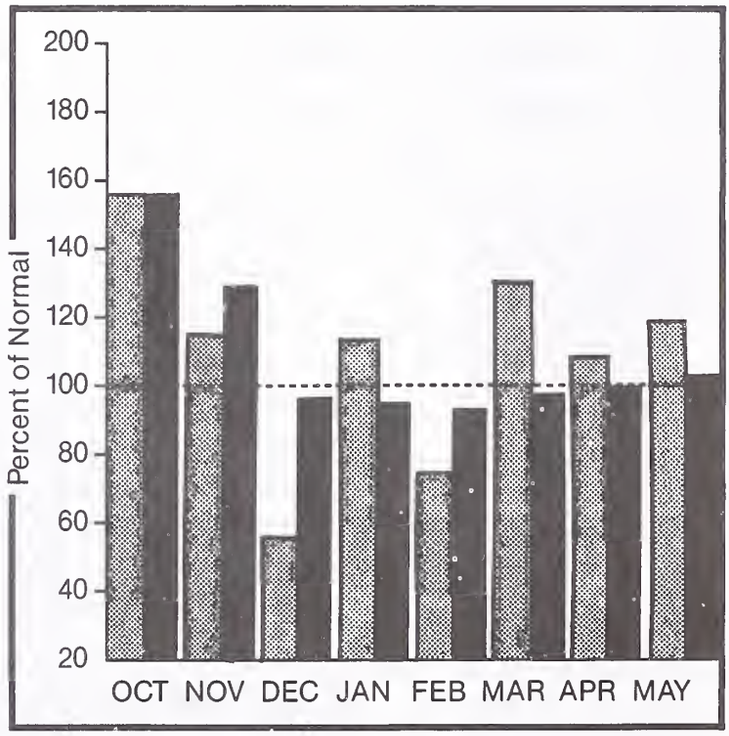
Mountain snowpack* (inches)



* St. Mary

Maximum
Minimum
Average
Current

Precipitation* (percent of normal)



*Based on selected stations

Monthly precipitation
Year to date precipitation

Water Supply Outlook

Mountain precipitation during May was above average. Runoff for May was below average on the Milk River and near average on the St. Mary River. Low elevation snow is gone but some remains at higher elevations. Currently, the snowpack is a little below average. Runoff for the remainder of the season is expected to be below average on the Milk River and near to a little below average on the St. Mary River.

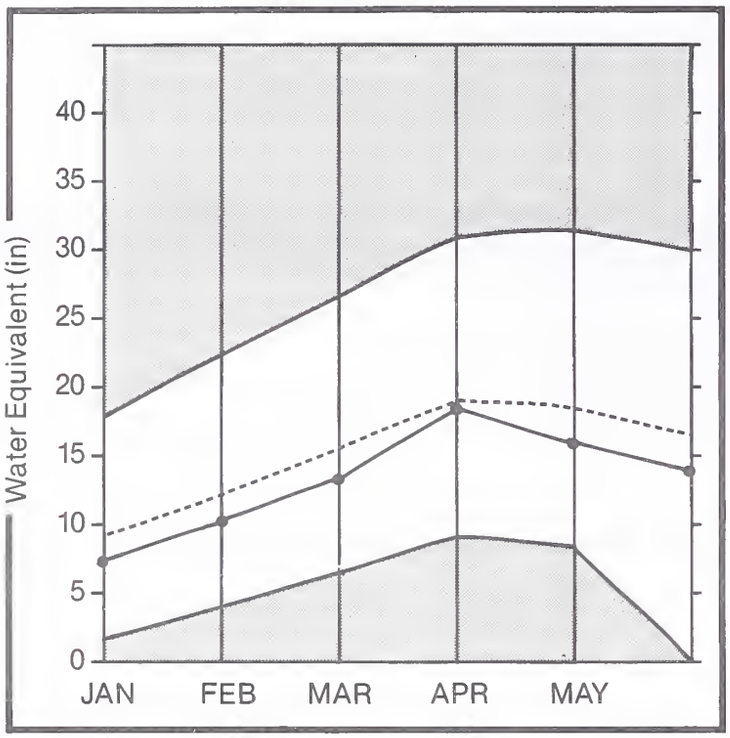
For more information contact your local Soil Conservation Service Office.

ST. MARY and MILK RIVER BASINS

RESERVOIR STORAGE (1000AF)					WATERSHED SNOWPACK ANALYSIS			
RESERVOIR	USEABLE CAPACITY	** USEABLE STORAGE ** THIS YEAR	LAST YEAR	AVG.	WATERSHED	NO. COURSES AVG'D	THIS YEAR AS % OF LAST YR.	AVERAGE
LAKE SHERBURNE	64.3	16.4	15.9	30.3	MILK HEADWATERS	2	0	87
FRESNO	127.0	74.2	60.8	89.4	BEAR PAW	5	0	138
BEAVER CREEK	3.5	1.2	2.6	3.2	MILK RIVER	7	0	95
NELSON	66.8	32.2	28.6	41.7	ST. MARY	3	215	93
					ST. MARY and MILK	8	230	95
					BOW RIVER in ALBERTA	13	198	139
					OLDMAN RIVER in ALBERTA	3	318	192

Yellowstone Basin

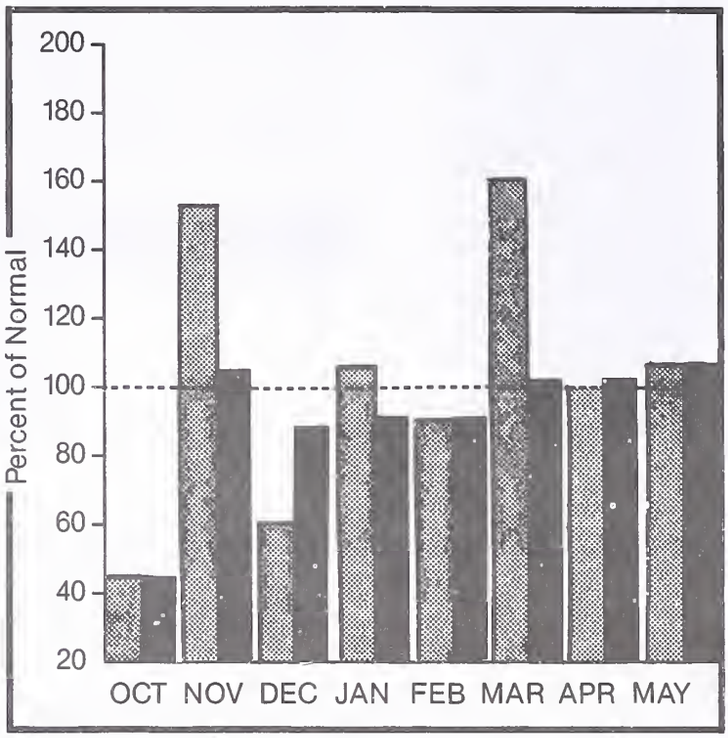
Mountain snowpack* (inches)



*Yellowstone above Big Horn

Maximum
Minimum
Average
Current

Precipitation* (percent of normal)



*Based on selected stations

Monthly precipitation
Year to date precipitation

Water Supply Outlook

Mountain precipitation during May was near average at most stations. Runoff during the month was above average. Some snow remains at higher elevations and currently the snowpack is a little below average in the Yellowstone Headwaters and well below average in the headwaters of the Bighorn, Tongue and Powder Rivers. Most streams in the Upper Yellowstone Drainage are expected to reach peak snowmelt runoff just before mid-June. Runoff for the remainder of the runoff season is expected to be near average.

For more information contact your local Soil Conservation Service Office.

YELLOWSTONE RIVER BASIN

RESERVOIR STORAGE (1000AF)					WATERSHED SNOWPACK ANALYSIS			
RESERVOIR	USEABLE CAPACITY	** USEABLE STORAGE ** THIS YEAR	LAST YEAR	AVG.	WATERSHED	NO. COURSES AVG'D	THIS YEAR AS % OF LAST YR.	AVERAGE
MYSTIC LAKE	21.0	5.0	11.0	5.2	YELLOWSTONE ab LIVINGSTON	11	162	90
COONEY	27.4	24.5	24.5	19.1	SHIELDS	6	1744	70
BIGHORN LAKE	1356.0	702.8	973.9	749.2	BOULDER-STILLWATER	3	136	103
TONGUE RIVER		NO REPORT			CLARK'S FORK-ROCK CREEK	10	145	93
					YELLOWSTONE above BIGHORN	23	184	88
					LITTLE BIGHORN	2	96	47
					WIND RIVER (Wyoming)	11	218	73
					BIGHORN RIVER (Wyoming)	17	205	69
					BIGHORN BASIN (Total)	24	196	76
					TONGUE RIVER (Wyoming)	5	100	26
					POWDER RIVER (Wyoming)	7	61	4
					YELLOWSTONE RIVER	46	182	77

Snow Data Measurements

May 15, 1989

SNOW COURSE	ELEVATION	DATE	SNOW DEPTH	WATER CONTENT	LAST YEAR	AVERAGE 1961-85
MONTANA						
8AOGER PASS PILLOW	6900	5/15/89	---	31.1	24.1	36.9
8ANFIELD MTN PILLOW	5600	5/15/89	---	6.8	2.1	13.1
8AREE CREEK	5500	5/15/89	43	22.7	21.7	39.0
8AREE MIDWAY	4600	5/15/89	21	10.8	9.8	22.5
8AREE TRAIL	3800	5/15/89	0	.0	.0	.0
8ARKER LAKES PILLOW	8250	5/15/89	---	14.2	13.5	15.8
8ASIN CREEK PILLOW	7180	5/15/89	---	5.4	7.5	9.6
8EAGLE SPGS PILLOW	8850	5/15/89	---	.8	1.9	4.9
8EAR PAW SKI AREA	5200	5/13/89	0	.0	.0	--
8EAVER CREEK PILLOW	7850	5/15/89	---	13.6	11.4	21.7
8LACK 8EAR PILLOW	7950	5/15/89	---	35.3	30.2	35.9
8LACK PINE PILLOW	7100	5/15/89	---	1.7	6.3	10.8
8LOODY DICK PILLOW	7550	5/15/89	---	.1	1.8	6.4
8OTS SOTS	7750	5/15/89	1	.4	--	7.5
8OULOER MTN PILLOW	7950	5/15/89	---	17.3	10.7	21.0
8OX CANYON PILLOW	6700	5/15/89	---	.0	.0	1.5
8OXELDER CREEK	5100	5/13/89	0	.0	.0	--
8RIDGER 8OWL PILLOW	7250	5/15/89	---	18.9	16.2	26.7
8RIDGER BOWL	7250	5/15/89	50	22.1	19.1	28.7
CALVERT CREEK PILLOW	6430	5/15/89	---	.0	.0	.1
CAMP SENIA	7890	5/15/89	6	1.8	--	9.4
CARROT 8ASIN PILLOW	9000	5/15/89	---	27.2	20.1	31.9
CASHE CREEK PILLOW	7800	5/15/89	---	3.0	5.1	8.1
CLOVER MEAOOW PILLOW	8800	5/15/89	---	11.9	13.7	17.4
COLE CREEK PILLOW	7850	5/15/89	---	15.8	19.1	20.2
COMBINATION PILLOW	5600	5/15/89	---	.0	.0	.5
COPPER 8OTTOM PILLOW	5200	5/15/89	---	.0	.0	1.4
COPPER CAMP PILLOW	6950	5/15/89	---	20.4	16.1	28.1
COPPER MOUNTAIN	7700	5/11/89	7	1.0	--	8.6
CRYSTAL LAKE PILLOW	6050	5/15/89	---	.4	4.9	8.7
DALY CREEK PILLOW	5780	5/15/89	---	.0	.0	2.3
OARKHORSE LK. PILLOW	8700	5/15/89	---	24.4	24.3	28.2
OEAOMAN CREEK PILLOW	6450	5/15/89	---	.0	.0	2.8
DISCOVERY 8ASIN	7050	5/15/89	0	.0	8.0	8.8
DIVIOE PILLOW	7800	5/15/89	---	6.8	6.5	8.7
DUPUYER CREEK PILLOW	5750	5/15/89	---	6.6	.0	1.0
EAST 8OULOER S	9250	5/17/89	63	26.5	25.0	33.1
EMERY CREEK PILLOW	4350	5/15/89	---	.0	.0	1.6
FISHER CREEK PILLOW	9100	5/15/89	---	36.0	30.8	38.8
FLATTOP MTN PILLOW	6300	5/15/89	---	36.2	30.7	46.7
FROHNER MDWS PILLOW	6480	5/15/89	---	.0	2.7	6.3
GI8BONS PASS	7100	5/15/89	23	10.8	7.4	18.9
GRAVE CRK PILLOW	4300	5/15/89	---	.0	.0	2.6
HAND CREEK PILLOW	5030	5/15/89	---	1.0	.0	3.4
HAWKINS LAKE PILLOW	6450	5/15/89	---	22.5	23.7	28.4
HEART LAKE TRAIL	4800	5/15/89	0	.0	3.2	10.7
HELL ROARING DIVIOE	5770	5/15/89	36	16.5	10.4	24.8
HOOOOO 8ASIN PILLOW	6050	5/15/89	---	33.0	30.6	44.0
HOODOO 8ASIN	6050	5/12/89	74	29.6	36.5	48.7
HOODOO CREEK	5900	5/12/89	69	28.6	32.4	45.1
INTERGAARD	6450	5/11/89	1	.2	--	5.8
KINGS HILL	7500	5/15/89	25	9.7	9.6	14.7
KIWANIS CAMP	3720	5/13/89	0	.0	.0	--
KRAFT CREEK PILLOW	4750	5/15/89	---	.0	.0	1.4
LAKEVIEW RDG. PILLOW	7400	5/15/89	---	.0	.0	5.1
LEMHI RIOGE PILLOW	8100	5/15/89	---	.9	6.0	8.1
LICK CREEK PILLOW	6860	5/15/89	---	.4	6.0	4.9
LOWER TWIN PILLOW	7900	5/15/89	---	20.3	14.8	22.3
LU8RECHT PILLOW	4680	5/15/89	---	.0	.0	.0
MADISON PLT PILLOW	7750	5/15/89	---	25.8	--	19.4
MANY GLACIER PILLOW	4900	5/15/89	---	.0	.0	1.1
MAYNARD CREEK	6210	5/15/89	22	9.2	3.8	12.0
MAYNARO CREEK PILLOW	6210	5/15/89	---	8.0	5.2	10.9
MONUMENT PEAK PILLOW	8850	5/15/89	---	18.8	19.0	24.4
MOSS PEAK PILLOW	6780	5/15/89	---	34.0	25.2	44.3
MT LOCKHART PILLOW	6400	5/15/89	---	15.6	13.6	20.4
MULE CREEK PILLOW	8300	5/15/89	---	12.4	13.7	16.1
NEVADA CREEK PILLOW	6480	5/15/89	---	8.5	8.1	11.4
NEZ PERCE CMP PILLOW	5650	5/15/89	---	.2	.7	5.3
NOISY 8ASIN PILLOW	6040	5/15/89	---	37.5	23.9	43.0
N.F. ELK CR PILLOW	6250	5/15/89	---	.0	.0	6.8
NORTH FORK JOCKO	6330	5/15/89	72	39.1	26.0	41.5
N.E. ENTRANCE PILLOW	7350	5/15/89	---	.0	.0	2.9
NORTHEAST ENTRANCE	7350	5/15/89	0	.0	.0	4.1
PICKET PIN D	9450	5/17/89	42	20.0	20.5	28.5
PICKFOOT CRK PILLOW	6650	5/15/89	---	.0	.0	3.1
PIKE CREEK PILLOW	5930	5/15/89	---	16.3	7.5	20.6
PLACER 8ASIN F	8830	5/17/89	38	18.0	17.5	22.9
PLACER 8ASIN PILLOW	8830	5/15/89	---	19.8	25.4	20.1
PORCUPINE PILLOW	6500	5/15/89	---	.0	--	.4
RED MOUNTAIN	6000	5/11/89	25	10.0	5.0	14.2
ROCKER PEAK PILLOW	8000	5/15/89	---	12.5	16.5	18.3
ROCKY 8OY	4700	5/13/89	0	.0	.0	.7
ROCKY 8OY PILLOW	4700	5/13/89	---	.0	.0	1.0
SADDLE MTN PILLOW	7900	5/15/89	---	18.8	18.4	26.8
SHOWER FALLS PILLOW	8100	5/15/89	---	19.8	27.5	29.2
SILVER RUN	6630	5/15/89	0	.0	.0	2.3
SILVER RUN PILLOW	6630	5/15/89	---	.0	.0	.0
SKALKAHO PILLOW	7260	5/15/89	---	19.3	19.6	24.2
SKYLARK TRAIL PILLOW	6200	5/15/89	---	34.9	16.7	29.7
S.F. SHIELDS PILLOW	8100	5/15/89	---	20.0	19.2	20.9
SPUR PARK PILLOW	8100	5/15/89	---	20.5	17.6	22.7
STAHL PEAK PILLOW	6030	5/15/89	---	34.8	22.1	39.8
STAR LAKE E	9650	5/17/89	96	43.0	35.5	49.1
SUCKER CREEK	3960	5/13/89	0	.0	.0	--
TAYLOR ROAO	4080	5/13/89	0	.0	.0	--
TEPEE CREEK PILLOW	8000	5/15/89	---	8.9	7.2	12.2
TIMBERLINE CREEK	8850	5/15/89	39	11.9	--	18.2
TWELVEMILE PILLOW	5600	5/15/89	---	.1	.0	6.6
TWIN LAKES PILLOW	6400	5/15/89	---	27.9	27.0	38.9
WALDRON PILLOW	5600	5/15/89	---	.0	.0	2.9
WARM SPRINGS PILLOW	7800	5/15/89	---	17.3	--	31.5
WEST YELL'ST PILLOW	6700	5/15/89	---	.0	.0	1.6
WEST YELLOWSTONE	6700	5/15/89	0	.0	.0	--
WHISKEY CREEK PILLOW	6800	5/15/89	---	11.1	3.5	10.0
WHITE MILL PILLOW	8700	5/15/89	---	25.5	21.5	26.2
WOOD CREEK PILLOW	5960	5/15/89	---	3.3	.0	4.1

Snow Data Measurements

June 1, 1989

SNOW COURSE	ELEVATION	DATE	SNOW DEPTH	WATER CONTENT	LAST YEAR	AVERAGE 1961-85
MONTANA						
BADGER PASS PILLOW	6900	6/01/89	---	28.6	7.3	22.8
BANFIELD MTN PILLOW	5600	6/01/89	---	.9	.0	3.3
BARKER LAKES PILLOW	8250	6/01/89	---	14.7	3.7	10.1
BASIN CREEK PILLOW	7180	6/01/89	---	2.1	1.1	6.0
BEAGLE SPGS PILLOW	8850	6/01/89	---	.0	.0	1.1
BEAR PAW SKI AREA	5200	5/25/89	10	1.0	.0	1.0
BEAVER CREEK PILLOW	7850	6/01/89	---	6.1	.3	18.1
BIG CREEK	6750	5/30/89	81	43.0	23.8	43.7
BISSON CREEK	4920	5/31/89	0	.0	--	--
BLACK BEAR PILLOW	7950	6/01/89	---	24.0	12.7	26.1
BLACK PINE PILLOW	7100	6/01/89	---	.0	1.0	3.4
BLOODY DICK PILLOW	7550	6/01/89	---	.0	.0	1.0
BOULDER MTN PILLOW	7950	6/01/89	---	11.4	.0	11.6
BOX CANYON PILLOW	6700	6/01/89	---	.0	.4	.0
BOXELDER CREEK	5100	5/25/89	10	1.0	.0	--
BRIDGER BOWL PILLOW	7250	6/01/89	---	12.1	.0	17.4
BRIDGER BOWL	7250	6/01/89	31	14.2	.0	21.0
CALVERT CR PILLOW	6430	6/01/89	---	.0	.0	.0
CARROT BASIN PILLOW	9000	6/01/89	---	24.7	6.7	26.6
CASHE CREEK PILLOW	7800	6/01/89	---	.0	.0	4.2
CHICKEN CREEK	4060	5/22/89	0	.0	.0	.0
CLOVER MDW PILLOW	8800	6/01/89	---	8.9	1.0	11.1
COLE CREEK PILLOW	7850	6/01/89	---	8.1	2.7	14.3
COMBINATION PILLOW	5600	6/01/89	---	.0	.0	.0
COPPER BOTTOM PILLOW	5200	6/01/89	---	.0	.0	.1
COPPER CAMP PILLOW	6950	6/01/89	---	15.7	.3	13.7
CRYSTAL LAKE PILLOW	6050	6/01/89	---	.0	.0	1.0
DALY CREEK PILLOW	5780	6/01/89	---	.0	.3	.0
DARKHORSE LK. PILLOW	8700	6/01/89	---	23.5	16.2	24.4
DEADMAN CR PILLOW	6450	6/01/89	---	.0	.0	.1
DISCOVERY BASIN	7050	6/01/89	0	.0	.0	5.7
DIVIDE PILLOW	7800	6/01/89	---	.0	.0	1.9
DUPUYER CREEK PILLOW	5750	6/01/89	---	.1	.0	.0
EMERY CREEK PILLOW	4350	6/01/89	---	.0	.0	.0
FISHER CREEK PILLOW	9100	6/01/89	---	32.0	24.0	33.3
FLATTOP MTN PILLOW	6300	6/01/89	---	36.8	22.2	38.7
FROHNER MDWS PILLOW	6480	6/01/89	---	.0	.0	1.8
GIBBONS PASS	7100	6/02/89	5	2.7	1.2	9.8
GRAVE CRK PILLOW	4300	6/01/89	---	.0	.0	.0
HANO CREEK PILLOW	5030	6/01/89	---	.0	.0	.0
HAWKINS LAKE PILLOW	6450	6/01/89	---	21.0	12.7	20.4
HEART LAKE TRAIL	4800	5/26/89	0	.0	.0	2.7
HERRIG JUNCTION	4850	5/22/89	10	4.9	.0	2.3
HOODOO BASIN PILLOW	6050	6/01/89	---	29.5	20.2	30.7
HOODOO BASIN	6050	5/26/89	46	22.4	22.6	35.0
HOODOO CREEK	5900	5/26/89	44	20.7	20.8	34.7
KINGS HILL	7500	5/26/89	15	5.8	.0	9.7
KIWANIS CAMP	3720	5/25/89	0	.0	.0	--
KRAFT CREEK PILLOW	4750	6/01/89	---	.0	.0	.0
LAKEVIEW RDG. PILLOW	7400	6/01/89	---	.0	.0	.0
LEMHI RIDGE PILLOW	8100	6/01/89	---	.0	.4	4.2
LICK CREEK PILLOW	6860	6/01/89	---	.0	.0	.5
LOWER TWIN PILLOW	7900	6/01/89	---	16.8	2.4	15.2
LUBRECHT PILLOW	4680	6/01/89	---	.0	.0	.0
MADISON PLT PILLOW	7750	6/01/89	---	14.5	--	10.0
MANY GLACIER PILLOW	4900	6/01/89	---	.1	.0	.0
MAYNARD CREEK	6210	6/01/89	0	.0	.0	3.9
MAYNARD CR PILLOW	6210	6/01/89	---	1.0	.0	4.0
MONUMENT PK PILLOW	8850	6/01/89	---	16.2	9.2	16.6
MOSS PEAK	6780	5/30/89	76	38.8	19.2	--
MOSS PEAK PILLOW	6780	6/01/89	---	33.3	16.0	32.3
MT LOCKHART PILLOW	6400	6/01/89	---	11.5	.0	11.1
MULE CREEK PILLOW	8300	6/01/89	---	9.1	5.1	11.3
NEVADA CREEK PILLOW	6480	6/01/89	---	.8	.4	6.5
NEZ PERCE CMP PILLOW	5650	6/01/89	---	.0	.2	.3
NEZ PERCE CAMP	5650	5/26/89	0	.0	.0	--
NEZ PERCE PASS	6570	5/26/89	0	.0	.4	--
NOISY BASIN PILLOW	6040	6/01/89	---	34.8	13.3	31.4
N.F. ELK CR PILLOW	6250	6/01/89	---	.0	1.4	3.5
NORTH FORK JOCKO	6330	5/30/89	65	35.4	10.6	28.4
N.E. ENTRANCE PILLOW	7350	6/01/89	---	.0	.0	.0
NORTHEAST ENTRANCE	7350	6/01/89	0	.0	.0	.5
OPHIR PARK	7150	5/28/89	9	3.6	.0	8.8
PETERSON MDW PILLOW	7200	6/01/89	---	1.9	1.2	4.3
PETERSON MEADOWS	7200	6/01/89	6	1.5	1.3	1.3
PICKFOOT CRK PILLOW	6650	6/01/89	---	.0	.0	.0
PIKE CREEK	5930	6/01/89	28	13.1	.0	--
PIKE CREEK PILLOW	5930	6/01/89	---	10.9	.0	12.6
PLACER BASIN PILLOW	8830	6/01/89	---	17.6	15.3	16.2
PORCUPINE PILLOW	6500	6/01/89	---	.0	.0	.0
RED MOUNTAIN	6000	5/31/89	6	1.2	.0	4.7
REVAIS CREEK	4800	5/31/89	0	.0	--	--
ROCKER PEAK PILLOW	8000	6/01/89	---	10.6	10.2	14.4
ROCKY BOY	4700	5/25/89	6	1.0	.0	.4
ROCKY BOY PILLOW	4700	5/25/89	---	1.1	.0	.3
SADDLE MTN PILLOW	7900	6/01/89	---	13.8	7.8	19.8
SHOWER FALLS PILLOW	8100	6/01/89	---	18.4	15.5	23.7
SILVER RUN PILLOW	6630	6/01/89	---	.0	.0	.0
SKALKAHO PILLOW	7260	6/01/89	---	15.1	9.3	16.2
SKYLARK TRAIL PILLOW	6200	6/01/89	---	18.0	.6	16.5
S.F. SHIELDS PILLOW	8100	6/01/89	---	16.3	2.5	15.6
SPUR PARK PILLOW	8100	6/01/89	---	17.9	3.1	16.5
SQUAW PEAK	6150	5/31/89	0	.0	--	--
STAHL PEAK PILLOW	6030	6/01/89	---	33.2	16.4	29.9
STRYKER BASIN	6180	5/22/89	41	20.4	6.0	21.1
SUCKER CREEK	3960	5/25/89	0	.0	.0	.2
TAYLOR ROAD	4080	5/25/89	2	.2	.0	.5
TEPEE CREEK PILLOW	8000	6/01/89	---	2.4	.3	5.6
TWELVEMILE PILLOW	5600	6/01/89	---	.0	.0	.6
TWIN LAKES PILLOW	6400	6/01/89	---	22.9	15.5	28.6
WALDRON PILLOW	5600	6/01/89	---	.0	.0	.1
WARM SPRINGS PILLOW	7800	6/01/89	---	16.9	13.6	25.7
WEST YELL'ST PILLOW	6700	6/01/89	---	.0	.0	.0
WEST YELLOWSTONE	6700	6/01/89	0	.0	.0	--
WHISKEY CREEK PILLOW	6800	6/01/89	---	.0	.0	1.2
WHITE MILL PILLOW	8700	6/01/89	---	18.9	12.2	19.9
WOOD CREEK PILLOW	5960	6/01/89	---	.1	.0	.0

Future Status of Water Supply Outlook Report

A recent evaluation of the Snow Survey and Water Supply Forecasting Programs interviewed 200 users of the forecasts. We learned that:

--Users who got their information by accessing our computer were very satisfied
--Users who depended on the monthly Water Supply Outlook Report needed information much earlier in the month.

--The reports contained more information than many users needed.

In summary, we are producing a report that is not doing the job for most users. And we are spending a lot of money on the report.

The state-wide WATER SUPPLY OUTLOOK REPORT will be discontinued. We are proposing three actions for the next water year to better meet your needs:

First: The user's direct access of forecasts via computer will be improved. We will provide better instructions and self-training materials. Also, District Conservationists who have computers will be encouraged to access forecasts and distribute local reports to those users who do not have computer facilities.

Second: The SCS state office will prepare individual forecast reports for the major river basins in the state. They will be the same as the reports available on the computer. Users, who request it, will be on a mailing list to receive one or more of the reports. They will be printed and mailed within a day or two after the basin forecast is completed and available on the computer.

Third: For users who are interested in the forecasts for their historical value rather than for decision- making, an annual summary will be provided. A West-Wide Report will continue to be available, published jointly with the National Weather Service.

This summer and fall will be spent developing the details of these procedures. You will be informed prior to next water year's reports, and new mailing lists will be prepared

Please call or write if you have questions.

The Following Organizations Cooperate With The Soil Conservation Service In Snow Survey Work

Canadian

Department of the Environment
- Atmospheric Environment Service
- Water Management Service

British Columbia Ministry of Environment
- Inventory and Engineering Branch, Hydrology Section

Alberta Environment
- Technical Services Division

Federal

U.S. Department of Agriculture
- Forest Service

U.S. Department of the Army
- Corps of Engineers

U.S. Department of Commerce
- NOAA, National Weather Service
- National Environmental Satellite Service

U.S. Department of the Interior
- Bureau of Indian Affairs
- Fish and Wildlife Service
- Geological Survey
- National Park Service
- Bureau of Reclamation

U.S. Department of Energy
- Bonneville Power Administration

State

Montana Conservation Districts
Montana Department of Fish, Wildlife, and Parks
Montana Department of Natural Resources and Conservation
Montana Department of State Lands
Montana State University - Agricultural Experiment Station
University of Montana - School of Forestry

Private

Big Sky of Montana
Butte Water Company
Confererated Salish & Kootenai Tribes
Flathead Valley Comminity College
Montana Power Company
Pondera County Canal & Reservoir Company

Other organizations and individuals furnish information for the snow survey reports.
Their cooperation is gratefully acknowledged.

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SOIL CONSERVATION SERVICE
SNOW SURVEY UNIT
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